REMARKS

Claims 28-35 remain pending in this application. Withdrawn claims 36-47 have been canceled without prejudice. Claims 28-29 and 31-35 have been amended. Support for the amendment to claim 28 can be found in the specification, for example, at page 3, lines 27-30; page 11, lines 28-29; page 12, lines 2-4; and page 13, lines 22-24. The amendments to claims 29 and 31-35 are to matters of form only. No new matter has been added.

CLAIM REJECTIONS - 35 USC § 103

At page 3, the Office Action rejects claims 28-35 under 35 U.S.C. § 103(a) as being unpatentable over CORNER et al. (EP 0301857 A2) in view of STEPHENS et al. (US 6,375,735). Applicant respectfully traverses the rejection.

Currently amended claim 28 is directed to a process of preparing aqueous crystalline biogenic silica. The process includes in part:

> a) incinerating a silica bearing organic source at a temperature from about 700°C up to about 1200°C for a time period for the silica to be in a crystalline form and free of carbon, and allowing the incinerated silica organic source to cool;

c) applying heat and pressure so that the added organic source and the alkaline solution in the vessel are at a temperature between 100°C and up to about 300°C for 1 to 4 hours, thereby forming an opaque aqueous crystalline biogenic silica with a pH from 12 to 14 and undissolved impurities derived from the added organic source; and

d) extracting the opaque aqueous crystalline biogenic silica from the vessel.

CORNER and STEPHENS fail to teach or suggest this method.

CORNER describes a method of producing water white and soluble amorphous silicate using burnt biogenic materials containing silica such as rice hulls. The burning of the biogenic materials is done under controlled conditions so that substantially all of the silica is in an amorphous rather than a crystalline state. A residue from about 2% to 8% or more of carbonaceous materials is present after the controlled burning (see, col. 4, lines 7-15). Sufficient carbon must be present to prevent discoloration (see, col. 4, lines 19-21). In this method, the amorphous biogenic silica is dissolved in a strong alkaline solution in the presence of a discoloration preventive agent such as an active carbonaceous material, and below the pressures and temperatures at which discoloration occurs (see, col. 4, lines 25-29). The discoloration preventive agent must be in an amount

sufficient to prevent discoloration of the soluble silica (see, col. 4, lines 53-63).

First, in distinction from the presently claimed method, CORNER fails to teach or suggest a method of producing soluble silica in a crystalline form, as recited in present claim 28. The silicate produced by CORNER is principally in the amorphous form although a minor amount of silica in the crystalline form can be tolerated (see, col. 4, lines 7-15). The significance of having the silica in an amorphous state is that the silica ash maintains a porous skeletal structure rather than migrating to crystals, and the amorphous form of silica does not cause silicosis thus reducing cautionary handling procedures (see, col. 2, lines 12-17).

Second, CORNER also fails to teach a method of preparing opaque soluble crystalline silica as presently claimed. CORNER produces water white silicates (for producing colorless, transparent, ultra-clear glass). CORNER recognizes that the presence of carbonaceous residue (about 2-8%) in the ash acts like “activated carbon” which absorbs or reacts with color forming agents (e.g., organic matter and metals) before they are released to the alkali solution (see, col. 3, lines 3-7). Indeed, CORNER teaches away from opaque silica by disclosing, for example, “In the absence of carbon, the soluble silicate had an amber color which is undesirable for many commercial applications.” (see, col. 4, lines 53-56).

Third, CORNER teaches away from burnt silica in a crystalline form and free of carbon, as featured in present claim 28. As disclosed throughout, CORNER critically relies on the presence of carbonaceous material in its method of producing water white silicates (see, for example, col. 4, lines 60-63). To modify CORNER and remove carbonaceous material would frustrate the principle of operation of CORNER to produce water white silicates.

The Office Action relies on STEPHENS to teach incinerating silica bearing organic source at a temperature of about 700-1200°C and concludes that it would have been obvious to modify the CORNER method to incinerate at higher temperatures (1800-2000°C) in order to transition from amorphous to crystalline form.

STEPHENS teaches a method of producing amorphous precipitated silicas or silica gels. In particular STEPHENS uses agricultural waste materials or biomass as low grade fuel to produce steam and electricity in a number of locations near rice milling and sugarcane processing operations. For this use, furnaces for the incineration of rice hulls have been designed to operate at extremely high temperatures without regard to the forms of silicas produced by this incineration. STEPHENS also mentions the phase diagram of silicon dioxide which indicates that a transition from the amorphous, non-crystalline form to the crystalline forms takes place at temperatures above 1093°C when

the silica is in the pure state (see, col. 7, lines 25-45). It mentions that the transition temperature is reduced when other components of the original rice hulls are present. However, none of the furnaces and the incineration processes described in STEPHENS is specifically used for producing crystalline silicas, as featured in the presently claimed method.

CORNER and STEPHENS fail to teach incinerating silica bearing organic source for a temperature and time period for the silica to be in a crystalline form and free of carbon. These references also do not teach the step of applying heat and pressure to the incinerated silica while in an alkaline solution to form an opaque aqueous crystalline biogenic silica, as recited in the presently claimed method.

Finally, regardless of what STEPHENS discloses, modifying CORNER to incinerate rice hulls at the high temperatures taught by STEPHENS fails to remedy the above noted deficiencies of CORNER. In fact, modifying CORNER in this way would render CORNER unsatisfactory for its intended purpose. For example, CORNER teaches use of the amorphous form of silicate and the advantages associated therewith. Utilizing a higher than transition temperature disclosed in STEPHENS would result in silicate that is NOT principally in the amorphous form, as required by CORNER.

For all of these reasons, CORNER and STEPHENS, alone or in combination, fails to teach or suggest, and would not have

rendered obvious, the methods of claims 28-35. Accordingly, Applicant requests reconsideration and withdrawal of the rejection.

CONCLUSION

Entry of the above amendments is earnestly solicited. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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